

SECTION 2

FEDERAL COORDINATION AND PLANNING

BASIS FOR FEDERAL COORDINATION PROCESS

In 1963, Congress and the Executive Office of the President expressed concern about the adequacy of coordination of federal meteorological activities. In response, Congress directed in Section 304 of Public Law 87-843--the Appropriations Act for State, Justice, Commerce, and Related Agencies--that the Bureau of the Budget prepare an annual horizontal budget for all meteorological programs in the federal agencies.

The Bureau of the Budget (now the Office of Management and Budget) issued a report entitled "Survey of Federal Meteorological Activities" (1963). The report described each agency's program in some detail, particularly its operational services, and detailed the relationship between the programs of the various agencies. The report revealed close cooperation but little evidence of systematic coordination. Based on this study, the Bureau of the Budget issued a set of ground rules to be followed in the coordination process. It established a permanent general philosophy for assignment and assessment of agency roles in the field of meteorology and set certain goals to be achieved by the coordination process. The Bureau of the Budget tasked the Department of Commerce (DOC) to establish the coordinating mechanism in concert with the other federal agencies. It also reaffirmed the concept of having a central agency--the DOC-- responsible for providing common meteorological facilities and services and clarified the responsibilities of other agencies for providing meteorological services specific to their own needs.

The implementation of these directives by DOC led to the creation of the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) which operates with policy guidance from the Federal Committee for Meteorological Services and Supporting Research. The principal work in the coordination of meteorological activities and in the preparation and maintenance of federal plans is accomplished by the OFCM staff with the advice and assistance of the Interdepartmental Committee for Meteorological Services and Supporting Research, and over 30 program councils, committees, and working groups.

MISSION AND STAFFING OF THE OFFICE OF THE FEDERAL COORDINATOR FOR METEOROLOGY (OFCM)

The mission of the OFCM is to ensure the effective use of federal meteorological resources by leading the systematic coordination of operational weather requirements and services, and supporting research, among the federal agencies. To discharge its mission, the OFCM has meshed its objectives with the objectives of the agencies that provide the services and perform the research. They include:

- ▶ Documenting agency programs and activities in a series of national plans and reports that enable agencies to revise/adjust their individual ongoing programs and provide a means for communicating new ideas and approaches to fulfill requirements.
- ▶ Providing structure and program to promote continuity in the development and coordination of interagency plans and procedures for meteorological services and supporting research activities.

- ▶ Preparing analyses, summaries, or evaluations of agency meteorological programs and plans that provide a factual basis for the Executive and Legislative branches to make appropriate decisions related to the allocation of funds.
- ▶ Reviewing federal weather programs and federal requirements for meteorological services and supporting research. This review may suggest additions or revisions to current or proposed programs or identify opportunities for improved efficiency, reliability, or cost avoidance through coordinated actions or integrated programs.

In 1979, a General Accounting Office (GAO) report, "The Federal Weather Program Must Have Stronger Central Direction," LCD-80-10, recommended stronger centralized planning and direction for federal weather activities. Pursuant to GAO's recommendation, DOC increased the permanent professional staff from one

to seven and assigned an additional professional staff member as the DOC representative. DOC also provides administrative support to the OFCM and provides approximately one-half of the OFCM's annual operating budget. The Department of Defense (DOD) currently provides two senior staff officers-- one Air Force and one Navy--and contributes approximately one-fourth of the annual budget. The Department of Transportation (DOT) Federal Aviation Administration (FAA) provides

one professional staff member and also provides approximately one-fourth of the annual operating budget. These four agency representatives are designated Assistant Federal Coordinators for liaison to their respective agencies. In all, 14 meteorologists, oceanographers, physical scientists, and administrative and computer-support personnel are assigned to the OFCM staff.

COORDINATION OF MULTIAGENCY PROGRAMS

The Federal Committee for Meteorological Services and Supporting Research (FCMSSR), established in 1964, provides high-level agency representation and policy guidance to the Federal Coordinator in resolving agency differences that arise during the coordination of meteorological activities and the preparation of federal plans. The Under Secretary of Commerce for Oceans and Atmosphere, who is also the Administrator of the National Oceanic and Atmospheric Administration (NOAA), serves as the FCMSSR Chair.

The 13 federal agencies that engage in meteorological activities or have a need for meteorological services are represented on FCMSSR. The FCMSSR membership includes: DOC, DOD, DOT, the Departments of Agriculture (USDA), Energy (DOE), Interior (DOI), and State (DOS), and the Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), National Transportation Safety Board (NTSB), and the U.S. Nuclear Regulatory Commission (NRC). In addition, the Office of Management and Budget (OMB) is represented.

OMB and FCMSSR provide guidance at the policy level to the Federal Coordinator. At the program management level, guidance from the agencies is provided by the Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR). Under ICMSSR, there are six standing committees: Basic Services, Operational Processing Centers, Automated Weather Information Systems, Aviation Services, Operational Environmental Satellites, and Space Environment Forecasting.

Also within the OFCM structure, there are seven program councils (PC) to coordinate specific interagency cooperative programs. There seven PCs are:

- ▶ Next Generation Weather Radar.
- ▶ Joint Automated Weather Observations.
- ▶ Automated Weather Information Systems.
- ▶ Aircraft Icing.
- ▶ Aviation Weather.
- ▶ National Space Weather.
- ▶ Improved Weather Reconnaissance.

Each of the PCs is comprised of decision-level representatives from the agencies directly concerned with the specific program area. The Federal Coordinator serves as the chairperson of each PC.

During FY 1997, the OFCM prepared and developed a proposal to streamline the interagency council, committee, and working group coordinating structure. In April 1997, ICMSSR accepted the proposed revisions and authorized OFCM to seek FCMSSR approval. The next FCMSSR meeting is scheduled for September 1997.

Next Generation Weather Radar (NEXRAD)

A major milestone in United States weather modernization programs was achieved during July 1996 with delivery of Weather Surveillance Radar-1988 Doppler (WSR-88D) number 161, the last system in the basic Next Generation Weather Radar (NEXRAD) procurement schedule. In response to a National Research Council report, three additional radars have been delivered which raises the total to 164 systems. Five of the 164 WSR-88D systems have been allocated to support training, maintenance, and testing activities; 123 are deployed at National Weather Service (NWS) sites within the contiguous 48 states, 29 are deployed

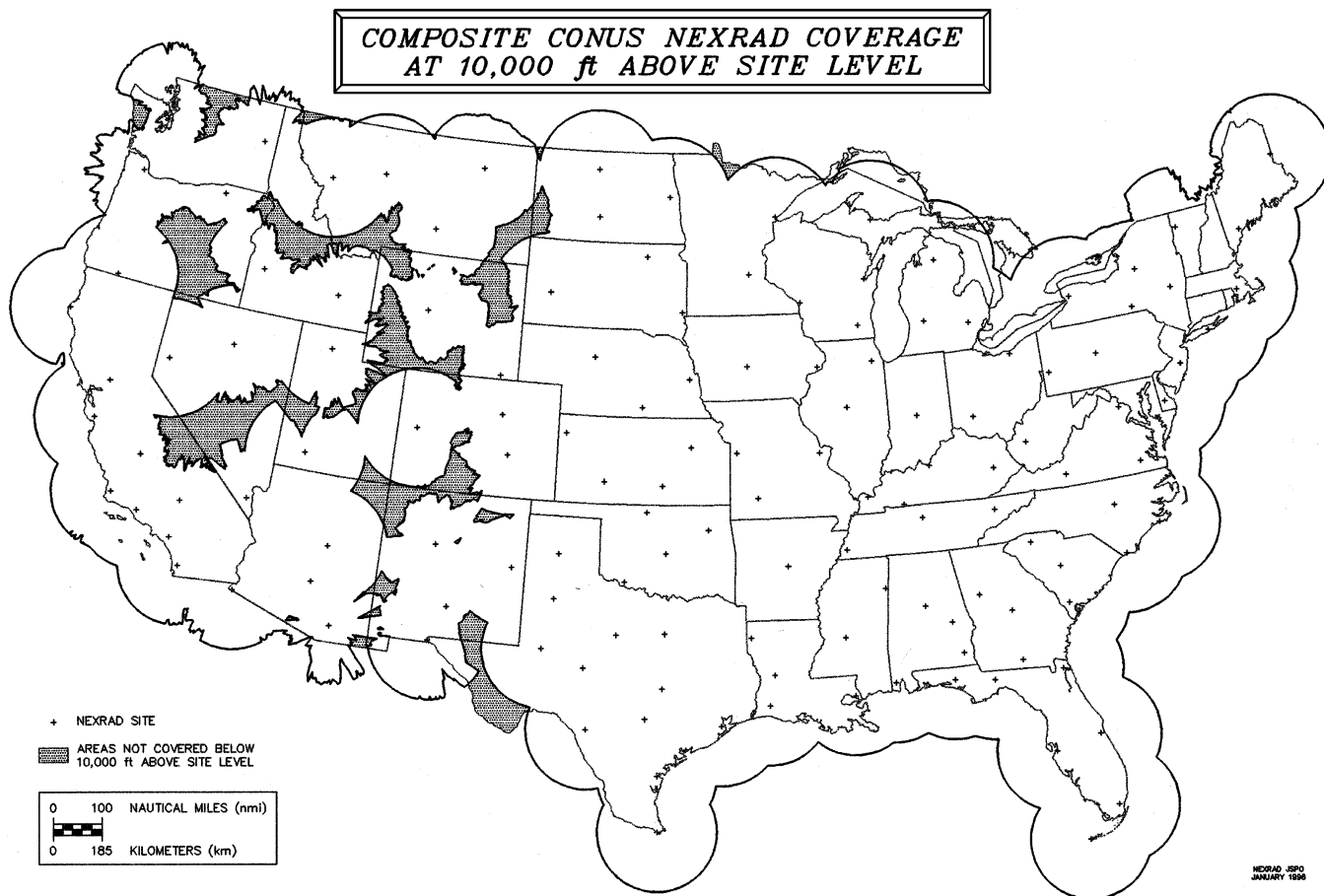


Figure 2-1 WSR-88D Continental United States Coverage

to DOD operational sites in the U.S. and overseas, and 12 were installed by the FAA in Alaska and Hawaii. As of August 1997, 137 WSR-88D units have been commissioned as the official site on the national network of weather radars--a little over three years since commissioning began during 1994.

The WSR-88D is a computerized Doppler weather radar developed to meet the needs of DOC, DOD, and DOT for improved ability to detect and maintain surveillance of hazardous weather. This need was defined in an OFCM-sponsored study in the late 1970's. It led, in 1979, to the establishment of a Joint System Program Office to develop and procure the new Doppler radar under policy guidance and oversight of the triagency NEXRAD Program Council.

The WSR-88D system's advanced technology provides automated Doppler signal processing, computerized processing of data by sophisticated meteorological software algorithms, state-of-the-art ergonomically designed operator workstations, and a

high-capacity, processor-driven communications capability. The system is modular in design, upgradeable, and has a long life-cycle expectancy. NEXRAD's advanced weather radar products meet the needs of the three Departments for accurate information on the location, severity, and movement of hazardous weather.

The NWS uses the WSR-88D for more than forecasts and warnings of severe weather. The WSR-88D also provides rainfall analysis capability for improved river stage and flood forecasts and for data to support effective management of water resources. This advance in water resources management reaches beyond flood control to impact areas, such as river navigation, drinking water supplies, pollution management, and water-based recreation--all with beneficial economic consequences. The DOD will use WSR-88D data to support military operations and protect defense assets in the United States, the Azores, and at key Pacific locations. The FAA uses the data to improve flight safety and to manage traffic more

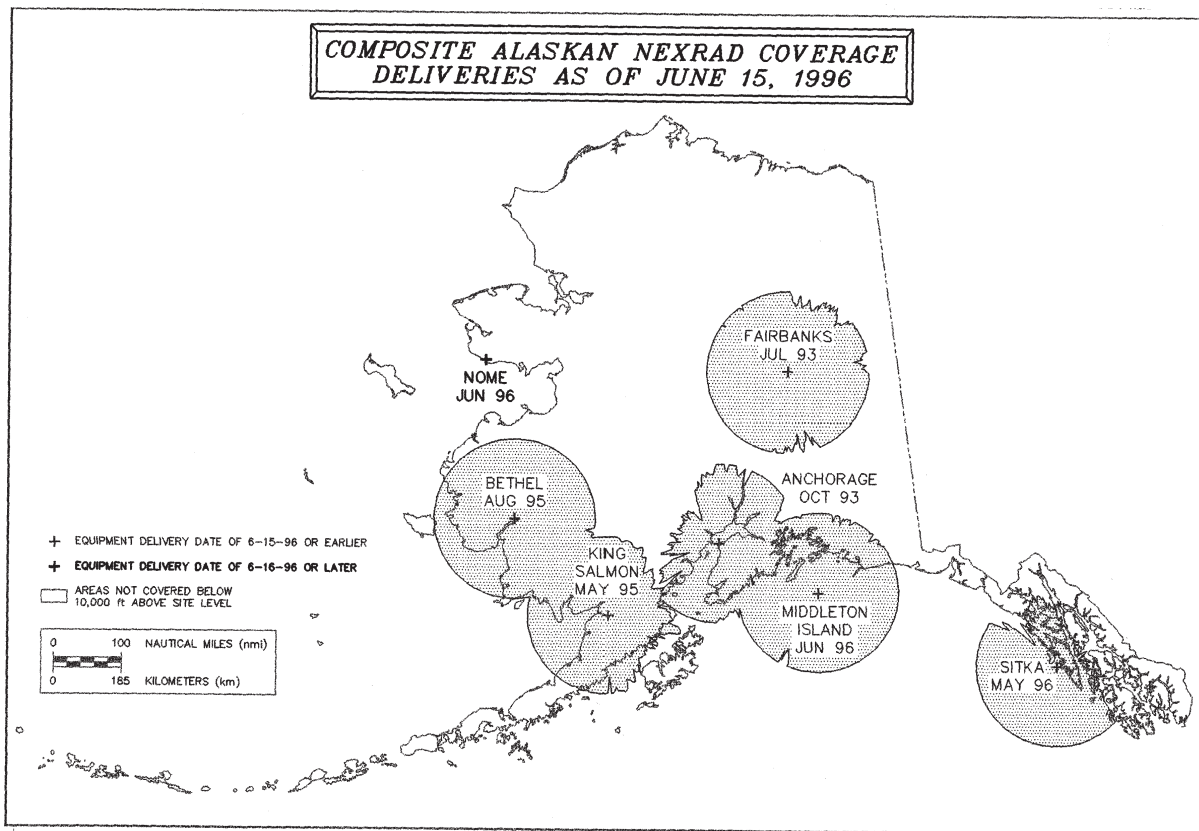


Figure 2-2 WSR-88D Alaskan Coverage

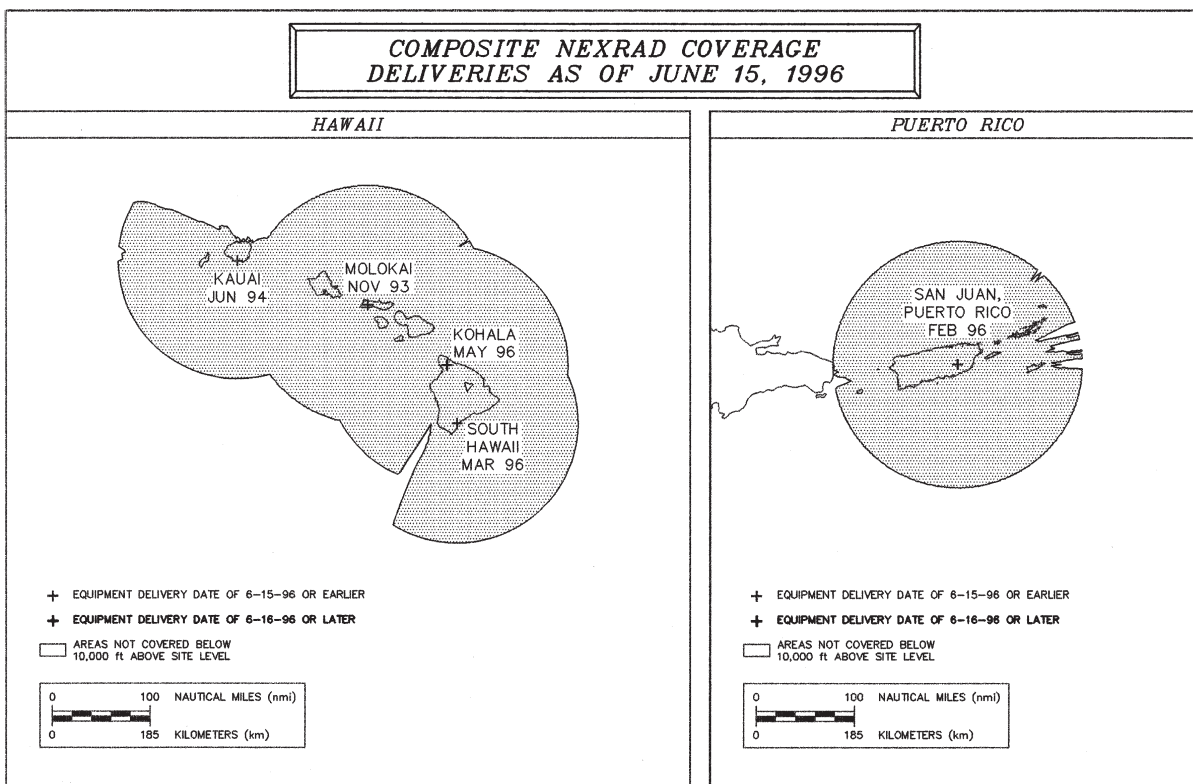


Figure 2-3 WSR-88D Hawaiian and Puerto Rican Coverage

efficiently within the National Airspace System. The National Climatic Data Center provides historical archiving of the WSR-88D data.

In January 1993, the NEXRAD Program Management Committee (PMC) was established to provide operational management of the WSR-88D program. Chartered by the NEXRAD Program Council (NPC), the PMC is a tri-agency committee comprised of representatives from the DOC (NWS), DOD (AWS and Naval Meteorology and Oceanography Command (CNMOC)), and DOT (FAA). The PMC is chaired by the Director, NWS Office of Systems Operations. The PMC responsibilities focus on effective and efficient WSR-88D operations and configuration management. Issues which cannot be resolved by the PMC are referred to the NPC for resolution.

On-going and planned activities for FY 1998 include development of an open systems architecture, relocation of the Griffis AFB radar, and work on the interfaces with the FAA's Weather and Radar Processor (WARP) and the NWS' Advanced Weather Interactive Processing System (AWIPS).

Automated Surface Weather Observations

As of August 1997, a total of 952 units have been purchased as part of the base program. The NWS has purchased 313 units, installed 287 units, and accepted 273 units. The FAA has purchased 539 units, installed 522 units, and accepted 513 units. The Navy has purchased 77 units, installed 76 units, and accepted 76 units. The Air Force has purchased 23 units, installed 21 units, and accepted 21 units. Collectively, the NWS and FAA have commissioned 405 units--NWS 230 and FAA 175.

In May 1997, the NWS formed the ASOS Program Management Committee (PMC), a tri-agency committee comprised of representatives from the NWS, FAA, and DOD, and chaired by the NWS ASOS Program Manager. The purpose of the PMC is to provide broad operational management of the ASOS program and to serve as a high-level configuration control board for addressing complex ASOS change proposals. Generally, the committee will meet on a bimonthly basis, but may be convened as required to address urgent issues. Issues that cannot be resolved will be elevated to OFCM. OFCM will assemble the appropriate high-level interagency representatives to address and resolve the issues.

Planned ASOS activities for FY 1997-1998 include continuing with installations, acceptance, and commissioning of ASOS units, primarily for NWS and FAA. In addition, NWS, FAA, and DOD (under the auspices of the ASOS PMC) will continue enhancement, development, and testing efforts for selected sensors.

Automated Weather Information Systems

Automated Weather Information Systems (AWIS) are required by a number of federal agencies. AWISs are being procured to provide an automated, high-speed, user-friendly man/machine interface to access and process large volumes of sophisticated meteorological data. They support the timely production of accurate and geographically precise warnings, forecasts, and special tailored products. They also provide the communications capability for expeditious product dissemination.

Major agency systems classified as AWISs are: NWS's Advanced Weather Interactive Processing System (AWIPS), FAA's Weather and Radar Processor (WARP) and the Integrated Terminal Weather System (ITWS), Air Force's Automated Weather Distribution System (AWDS) and the Meteorological Information Standard Terminal (MIST), and Navy's Navy Integrated Tactical Environmental Subsystem (NITES). These systems include communications to collect and distribute raw data, information and processed products but exclude observation subsystems and the supercomputers at the major centers.

During the remainder of 1997, a limited production and installation of AWIPS will continue at NWS Weather Forecast Offices. Following additional operational test and evaluation, a decision will be sought for the additional systems with commissioning planned in 1998.

National Aviation Weather Program

The National Aviation Weather Program Council (NAWPC) was formed in 1989 and a supporting Joint Action Group (JAG) in 1990 to address aviation weather issues. Membership includes the Departments of Agriculture, Commerce, Defense, and Transportation as well as the National Transportation Safety Board and NASA. The first major undertaking of the JAG resulted in the publication of the *National Aviation Weather Program Plan (NAWPP)* in 1992 which outlined unmet user needs.

After some intervening time and prompted by recommendations from the National Research Council, the NAWPC tasked the JAG with the preparation of a National Aviation Weather Program Strategic Plan. The *National Aviation Weather Program Strategic Plan* was subsequently approved by the NAWPC in April 1997 and published and distributed in August 1997. Following completion of the Strategic Plan, the JAG was tasked by the NAWPC to develop an Implementation Plan. The JAG will be meeting regularly over the next several months with the goal of having a draft implementation plan by the end of February 1998.

National Space Weather Program Council (NSWPC)

At the January 1997 meeting, the NSWPC approved for publication the *National Space Weather Program Implementation Plan*. The plan was distributed in the Spring 1997 with another version planned within about a year. The implementation plan builds on the *National Space Weather Program Strategic Plan* published in late 1995. The implementation plan covers research, modeling, and observation requirements, and provides guidance on priorities, agency roles and responsibilities, and program management. The council also considered the space weather aspects of the OFCM coordinating structure and recommended to ICMSSR the Committee for Space Environmental Forecasting and the Working Group for Space Weather be consolidated into the Committee for Space Weather. In addition, the council proposed the new committee be placed under the program council rather than ICMSSR.

The National Science Foundation again requested research to support the National Space Weather Program. The scientific community will share nearly \$1 million in research money acquired from multiple agencies and identified as National Space Weather Program funding.

Improved Weather Reconnaissance System (IWRS)

The Improved Weather Reconnaissance Program Council (IWRPC) was formed to manage the

acquisition of the IWRS. Currently, the Air Force Reserve Command's 53rd Weather Reconnaissance Squadron (53 WRS) operates ten WC-130H aircraft equipped with the IWRS, which provides an automated, accurate, high-density, data-gathering capability in support of tropical cyclone and winter storm forecasting operations. The 53 WRS has a Congressionally mandated charter to provide hurricane reconnaissance in support of the NWS's National Hurricane Center/Tropical Prediction Center. With the successful completion of the IWRS program, the IWRPC continues to meet at least annually to evaluate the operational effectiveness of the IWRS and to evaluate/approve proposals for IWRS improvements and upgrades. In March 1997, the IWRPC met, in conjunction with the 51st Interdepartmental Hurricane Conference, to review the status of ongoing projects and enhancements.

The Air Force and the IWRPC are actively pursuing the acquisition of the Global Positioning System (GPS)-based Atmospheric Vertical Profiling System (AVAPS) to replace the Lightweight Omega Digital Dropwindsonde System (LOD2), which will become obsolete with the demise of the Omega radionavigation system on September 30, 1997. Two prototype AVAPS systems were installed by the National Center for Atmospheric Research (NCAR) in June 1997, and test and evaluation phase is currently underway. While the 53 WRS will not achieve full operational capability by September 30, 1997, some limited capability to provide vertical atmospheric soundings will exist. Current plans call for the 53 WRS to receive three "slick" (no weather equipment) C-130J models--the likely successor to the WC-130H--in January 1998 to be used for aircrew familiarization and training. The C-130J sports a "glass cockpit," is GPS equipped, and promises significantly enhanced performance. The first (3) WC-130Js will be received in October 1998, and the three "slick" C-130Js will be returned to be weather equipped. During the 1999 hurricane season, the 53 WRS will fly a mixed fleet of J and H models.

PLANNING, COMMITTEE ACTIVITIES, AND PUBLICATIONS

Atmospheric Transport and Diffusion

The Working Group for Atmospheric Transport and Diffusion (WG/ATD) met several times during FY 1997 to work on a new directory for atmospheric transport and diffusion models, equipment and projects. The new

directory will be an update and consolidation of two previous directories; one produced in CY 1993 by the OFCM and the other produced in CY 1995 by the Department of Energy. The projected publication date for the new directory is the 2nd quarter of FY 1998.

In the proposal to streamline the Federal coordinating structure, the WG/ATD will be aligned under the Committee for Weather Operations and Services.

Basic Services

The Committee for Basic Services (CBS) met on October 25, 1996 and received briefings on: (1) the activities and plans of the working groups for which CBS has oversight; (2) the history, status, and plans of the Federal Lightning Detection Program; (3) the snow data requirements at the United States Department of Agriculture, and (4) the streamlined Federal coordinating structure.

A major piece of the OFCM's proposal to streamline the Federal coordinating structure is based upon a restructured CBS. The CBS will be divided into two committees--the Committee for Observing Systems and the Committee for Weather Operations and Services. This realignment achieves one objective of the streamlining which was to decrease a committee's oversight of working groups through a smaller span of control.

Climate Services

The Working Group for Climate Services (WG/CS) was formed in an effort to provide a focal point for federal involvement in climate change, ozone depletion, seasonal to interannual forecasting, and climatological applications. The WG/CS has provided a unique forum, bringing together an extremely diverse group of agencies which conduct a very broad scope of activities related to climatology. The exchange of information at working group meetings has been invaluable, and the WG/CS is looking into methodologies for providing some unity to their various climate services efforts. The working group is assessing the impacts of the NWS' future efforts to downsize the upper air observing system.

Under the proposal to streamline the Federal coordinating structure, the WG/CS will be aligned with the Committee for Weather Operations and Services.

Doppler Radar Meteorological Observations

The Working Group for Doppler Radar Meteorological Observations (WG/DRMO) is continuing the revision and updating of *FMH-11, Part A: System Concepts, Responsibilities, and Procedures*. During the past year, several drafts have been circulated among the member agencies for comments and revisions. A final draft is being prepared for review and publication in late

1997. In the future, the group plans to revise each of the four parts of the FMH-11 handbook. The majority of the coordination is being conducted via correspondence and electronic mail; no meetings have been held.

Under the proposal to streamline the Federal coordinating structure, the WG/DRMO will be aligned with the new NEXRAD Program Council. The working group will also monitor the responsibilities of the Working Group for Radar Meteorological Observations (see Radar Meteorological Observations).

Hydrometeorology

The Working Group for Hydrometeorology (WG/HM) has been addressing areas for mutual cooperation and coordination in hydrometeorology. One of its first tasks has been the development of a handbook for automated flood warning systems. The "Handbook on Automated Local Flood Warning Systems" describes local flood warning systems in terms of types, standards, requirements, implementation, and maintenance. The NWS finalized and published the document in February 1997.

In the proposal to streamline the Federal coordinating structure, the WG/HM will be aligned under the Committee for Weather Operations and Services.

Lightning Detection Systems

The Working Group for Lightning Detection Systems (WG/LDS) met in May 1997 to: (a) discuss the status of the *Handbook on Lightning Strike Locating Systems*, (b) review the status of the National Weather Service's lightning data contract, and (c) examine the requirements for space-based lightning data. The first draft of the Handbook is scheduled to be completed by the end of 1997. In the interim, a preliminary abbreviated-version will be available this fall. A NASA goal is to get a lightning detection instrument in geostationary orbit by early in the 21st century. To support this goal, the Working Group is coordinating agency requirements for space-based total lightning data. There is also an effort underway by the MIT's Lincoln Lab to articulate and, where possible, quantify operational benefits of space-based total lightning data.

In 1996, Federal agencies consolidated their agency plans for another procurement of lightning data; the original NWS contract ended in September 1996. The group assisted in drafting a statement of work which was incorporated into the RFP subsequently issued by the NWS. The new contract with Global Atmospheric Inc.

(GAI) began on October 1, 1996 for FY 1997 through FY 2001. Agencies participating in the contract include DOA, DOD (USAF, USA, and USN), DOI (BLM), DOT (FAA and Volpe Center), NASA, and NWS.

Under the proposal to streamline the Federal coordinating structure, the WG/LDS will be aligned with the Committee for Observing Systems.

Marine Environmental Services

The Working Group for Marine Environmental Services (WG/MES) published the *Federal Plan for Marine Environmental Data, Services, and Supporting Research (June 1996)* with the objective to define a responsive national policy for marine environmental services. The plan will serve as a mechanism for interagency cooperation in marine data collection efforts.

Under the proposal to streamline the Federal coordinating structure, the WG/MES will be aligned with the Committee for Weather Operations and Services.

Meteorological Codes

During FY 1997, the WG/MC (1) finalized a modification to the non-convective low-level windshear group in TAF (FM 51-X Ext); (2) coordinated a National/International Originating Center code figure within GRIB (FM 92-X) for the Naval Oceanographic Office at Stennis Space Center, Mississippi; and (3) approved and forwarded to WMO an exception to TESAC (FM 64-IX). The group also reviewed a proposal for developing a surface observation code (similar to METAR) for automated stations and continued discussions for a standard code format for data being exchanged between operational processing centers. The latter is part of proposals and discussions within the WMO on Gridded Binary (GRIB) and Binary Universal Form (BUFR). The WG/MC is continuing coordination and review of the initial chapters of FMH-12.

Under the proposal to streamline the Federal coordinating structure, the WG/MC will be aligned with the new Committee for Weather Information Systems.

Mobile Meteorological Equipment

ICMSSR tasked the Ad Hoc Group for Mobile Meteorological Equipment (AHG/MME) to provide a forum for coordinating information on mobile observing and forecasting systems within the federal meteorological community. In December 1995, AHG/MME published a revised *Federal Directory of Mobile Meteorological Equipment and Capabilities* to catalogue both current

mobile systems and capabilities and those programmed to be available in the near future.

In the proposal to streamline the Federal coordinating structure, the AHG/MME will be disestablished. The responsibilities for AHG/MME will be monitored by the newly-formed Committee for Observing Systems.

Monitoring the Stratosphere

In April 1997, the Working Group for Monitoring the Stratosphere (WG/MS) sponsored a meeting of scientists from the public and private sectors as well as the academic community to address ground-based and *in situ* ozone measurements for the upper troposphere and lower stratosphere. A major focus of the meeting was correlative measurements with space-based systems. The Working Group also continues oversight for the implementation of the *National Plan for Stratospheric Monitoring, 1988-1997 (July 1989)*, which includes monitoring for ozone, trace gases, and water vapor. Updating the National Plan is expected to begin in late 1997.

Under the proposal to streamline the Federal coordinating structure, the WG/MS will be aligned with the new Committee for Observing Systems.

Operational Environmental Satellites

Within the proposal to streamline the Federal coordinating structure, the Committee for Operational Environmental Satellites was redesignated as the Working Group for Operational Environmental Satellites (WG/OES). WG/OES will be aligned under the Committee for Observing Systems.

Operational Processing Centers

The principals of the OFCM-sponsored Committee for Operational Processing Centers (COPC) and the Shared Processing Program Operations Steering Committee (SPOSC) meet twice a year to discuss data issues, modeling activities and algorithm development, and other cooperative efforts. During FY 1997, the two committees met consecutively, followed by a joint executive session. The October 1996 meeting was hosted by the Naval Oceanographic Office (NAVOCEANO) in New Orleans, Louisiana, and the May 1997 meeting was hosted by the Fleet Numerical Meteorology and Oceanography Center (FNMOC) in Monterey, California. Progress continues on linking the centers together using Asynchronous Transfer Mode (ATM)

communications, which significantly upgrades the landline and satellite communications that the OPCs currently use. The first ATM link between FNMOC and Air Force Global Weather Center was operational in February 1996; the ATM network will be fully operational in early FY 1998. The COPC also received updates on the National Polar-Orbiting Operational Environmental Satellite System (NPOESS) and the North American Atmospheric Observing System (NAOS). The Director of the National Centers for Environmental Prediction serves as chairman of the NAOS Program Council--the goal of NAOS is to redesign the composite meteorological observing system to enhance North American weather forecasting for better weather services and greater cost efficiency.

The Ad Hoc Group for Observations (AHG/OBS), which was formed by the COPC in 1996 to address the issues of declining numbers of observations and the variability of data types and counts in the databases of the OPCs, was very active during FY 1997. The Chairman, AHG/OBS, provided an update on the group's activities at both meetings.

Post-Storm Data Acquisition

A Working Group for Post-Storm Data Acquisition (WG/PSDA) was established by ICMSSR to prepare an interagency plan for scientific and engineering data acquisition, especially highly perishable data, after coastal storms, tornadoes, tsunamis, and lake storms. The following agencies actively participate: the U.S. Army Corps of Engineers, NWS, FEMA, USGS, NOAA Coastal Oceans Program, National Institute for Standards and Technology (NIST), and the USDA's Natural Resources Conservation Service.

In 1997, the WG/PSDA completed a memorandum of understanding with the Civil Air Patrol (CAP) to provide cost-effective aerial post-storm survey flights on an "as available" basis. To the extent possible, CAP will provide the needed airborne support to meet the WG/PSDA's requirements within 6 hours of a request from an authorized OFCM authority. The *National Post-Storm Data Acquisition Plan* is in the final stages of completion.

Under the proposal to streamline the Federal coordinating structure, the WG/PSDA will be aligned with the new Committee for Observing Systems.

Profiler Systems

The Working Group for Profiler Systems (WG/PS)

met in the spring of 1997 in conjunction with a Profiler Systems Signal Processing Workshop. The use of profilers has proven valuable in many operational applications such as severe weather forecasting, pollution monitoring and space launch support; however, a limiting factor is in the signal processing. Current signal processing techniques affect real-time applications where there is little time to validate data accuracy. Many of the signal processing problems are well understood and can be solved by implementing state-of-the-art techniques. The WG/PS is drafting a review paper that covers the state-of-the-technology and outlines future profiler enhancements. The draft review paper is planned to be complete in the first quarter FY 1998.

During FY 1998, the working group will be working on an action plan to achieve quality and reliability improvements in profiler products.

Under the proposal to streamline the Federal coordinating structure, the WG/PS will be aligned with the new Committee for Observing Systems.

Radar Meteorological Observations

Under the proposal to streamline the Federal coordinating structure, the WG/RMO will be disestablished. The responsibilities for WG/RMO will be monitored by the Working Group for Doppler Radar Meteorological Observations.

Satellite Telemetry

The Satellite Telemetry Interagency Working Group (STIWG) is co-chartered by the Federal Coordinator for Meteorology and the Chief, Office of Water Data Coordination. The STIWG reports to the coordinators through the Committee for Basic Services and the Hydrology Subcommittee in their respective coordinating infrastructures. The STIWG agencies collect data from remote Data Collection Platforms (DCP) through the GOES Data Collection System (DCS). DCPs owned by the user agencies sense and collect a variety of data at remotely located positions. Among those types of data are rainfall, stream flow, water levels in lakes and reservoirs, seismic stress and vibration, wind direction and speed, atmospheric pressure, soil moisture, air/soil temperature, sea surface temperatures, and relative humidity.

A major concern of the STIWG and NESDIS has been the growing numbers of DCPs and the possibility of system saturation. Several international users are coming on-line with a growing number of DCPs. In response to this growing concern, NESDIS has taken steps to

increase the efficiency of bandwidth use in the satellite and to increase the throughput at the ground processing system at the Command and Data Acquisition Station. The STIWG member agencies have funded additional demodulators for the ground receiving system and a domestic communications satellite channel to disseminate the collected data to users. They have also funded studies to evaluate the advantages and impacts of higher baud-rate equipment. Based on these results, STIWG agencies have jointly funded the development of 300 and 1200 baud transmitters, demodulators, and test sets.

The STIWG met three times in FY 1997 to discuss the operations of the GOES DCS. The working group members discussed the joint funding of GOES DCS enhancements and, in particular, the contract for higher baud rate transmitters, demodulators, and test sets which were being developed under a contract managed by NESDIS. NESDIS awarded the contract in September 1995 with delivery of prototypes scheduled for fiscal year 1997.

During a special meeting in July, the members discussed further developments in the high baud rate contract and the need for funding for a DOMSAT (domestic satellite) channel in 1997 and beyond. STIWG member agencies currently use direct read-out receivers to acquire the data they remotely sense and transmit to GOES DCS. Those data are streamed to the earth station at Wallops Island, Virginia, which retransmits the data to the DOMSAT for broadcast. This system configuration was programmed to be replaced by the NOAAPORT system. NOAAPORT will operate in a different frequency band than the DOMSAT broadcast, thus, requiring some modifications to the direct read-out receivers and antennae.

The STIWG completed its review and approved the *National GOES DCS Operations Plan* for publication. The plan will be available for distribution in August 1997. The STIWG has reduced the number of regular meetings from 4 to 2 per year, but will meet as needed for funding and contract business.

In the proposal to streamline the Federal coordinating structure, the STWIG will be aligned under the new Committee for Weather Information Systems.

Severe Local Storms Operations

The Working Group for Severe Local Storms Operations (WG/SLSO) completed its work on the *National Severe Local Storms Operations Plan* and the plan was published in March 1997.

Within the proposal to streamline the Federal coordinating structure, the WG/SLSO will be aligned under the Committee for Weather Operations and Services.

Surface Observations

With the publication of FMH-1, the Working Group for Surface Observations (WG/SO) recommended the disestablishment of the Ad Hoc Group for FMH-1 and assumed the responsibilities for maintenance of the publication. The group plans to revisit the topic of a common interagency observing handbook. In addition, the group is examining the need to broaden the working group's focus from an aviation-oriented perspective to one that balances the needs of all surface observation users.

Under the proposal to streamline the Federal coordinating structure, the WG/SO will be aligned with the new Committee for Observing Systems.

Tropical Cyclone Research and Reconnaissance

In January 1997, the Working Group for Tropical Cyclone Research published the *National Plan for Tropical Cyclone Research and Reconnaissance (1997-2002)*--the third in the series dating back to December 1990. The plan details a program for tropical cyclone/hurricane research and reconnaissance that provides an improving level of service to adequately protect the citizens of the coastal areas of the United States. It defines the challenges that the forecast centers face and divides them into four focus areas: observations/analysis, forecasting, communications/dissemination, and verification/documentation. Within each focus area, a series of objectives (14 total) are defined. These objectives closely correlate with the highest priority challenges identified by the forecast centers and are designed to focus the cooperative efforts among the various research groups, both within and outside of government. The goals of the program, over the next 5 years, are: (1) to validate the data and product requirements, together with the supporting research, needed to provide for long-term improvements in tropical cyclone forecasting and warning services and (2) to determine the optimum mix of complementary and cost-effective remote and *in-situ* systems to satisfy those requirements. Progress on achieving the goals and objectives of the program will be reviewed at the annual Interdepartmental Hurricane Conferences, hosted by the OFCM, as well as in updates to the plan.

In the proposal to streamline the Federal coordinating structure, the Task Group for Tropical Cyclone Research (TG/TCR) will be disestablished. The responsibilities for the TG/TCR will be absorbed by the renamed Working Group for Hurricane and Winter Storms Operations and Research (WG/HWSOR).

Upper Air Observations

The Working Group for Upper Air Observations (WG/UAO) met in the Spring to review DOD's research and development efforts on GPS-based upper air observation systems and to further define agency requirements. In May, the Ad Hoc Group for Federal Meteorological Handbook No. 3 (AHG/FMH-3) completed the revisions of the handbook and received WG/UAO approval for publication and distribution. *FMH-3, Rawinsonde and Pibal Observations* was distributed in May 1997. With the completion of this task, the WG/UAO recommended and received CBS concurrence to disestablish the ad hoc group.

Under a proposal to streamline the Federal coordinating structure, the WG/UAO will be aligned within the Committee for Observing Systems.

Volcanic Ash Reporting and Warning

At the request of the federal agencies in 1993, the ICMSSR established the Ad Hoc Group for Volcanic Ash (AHG/VA) to develop a national plan for Volcanic Ash Reporting and Warning. The plan will identify responsibilities of the federal agencies to report and collect data on volcanic disturbances and eruptions, and to develop forecasts and warnings of locations and movement of ash plumes or clouds.

The AHG/VA continues its work on the national plan. The document has undergone numerous changes during the course of its development including a name change. The new title is "*A National Framework for Volcanic Ash Hazards to Aviation.*" The final draft is being reviewed by members and publication is projected for early 1998.

During 1997, the AHG/VA also discussed the utility that the World Area Forecast System (WAFS) will bring to the Volcanic Ash Warning System. The United States supports the ICAO Volcanic Ash Warning System and will have two Volcanic Ash Alerting Centers (VAACs)--one in Anchorage, Alaska, and another in Washington, DC. The group also addressed an interagency effort to place seismic sensors on more Alaskan volcanoes to promote safety along the North Pacific air routes.

During the summer 1996, the Coast Guard and the University of Alaska assumed responsibility for installation of additional instruments on four volcanoes. The FAA provided funds for the additional sensors in 1997 as well.

Interdepartmental Hurricane Conference

The Office of the Federal Coordinator for Meteorology hosted the 51st Interdepartmental Hurricane Conference (IHC) during March 25-28, 1997 in Miami, Florida. The conference agenda consisted of: a review of the 1996 tropical cyclone season in the Atlantic Ocean, Gulf of Mexico, Caribbean Sea, and the Pacific Ocean; the current tropical cyclone research and requirements for the 1997 tropical cyclone season; a review of the military weather reconnaissance mission; and the revision to the *National Hurricane Operations Plan* (NHOP). The featured, guest speaker was Dr. Gregory Holland, Australian Bureau of Meteorology, whose presentation described the results of "pioneering adventures" in tropical cyclone reconnaissance including the performance of unmanned aerial vehicles. Further testing of this capability is planned in FY 1998 at the Joint Typhoon Warning Center in Guam.

The Working Group for Hurricane and Winter Storms Operations met in conjunction with the IHC to update the NHOP. The 1997 edition of the NHOP was published in May. The 52nd Interdepartmental Hurricane Conference is scheduled for January 26-30, 1998 in Clearwater Beach, Florida.

In the OFCM's streamlining proposal, the WG/HWSO will absorb the responsibilities of the TG/TCR and be renamed the Working Group for Hurricane and Winter Storms Operations and Research (WG/HWSOR).

Committee and Working Group Structure

A schematic of the current federal committee and working group structure for meteorological coordination is found on the back inside cover of this plan.

Federal Meteorological Handbooks

At the direction of the ICMSSR, the OFCM maintains a continuing program to revitalize the Federal Meteorological Handbooks (FMH). Responsibility for review and revisions, if necessary, of each handbook is assigned to the appropriate committee and/or working group within the existing interdepartmental coordinating infrastructure. The FMH series includes observing and

reporting practices for surface, upper air, radar, and meteorological rocket observations. The titles of nine existing handbooks are: *Surface Weather Observations and Reports*, *Surface Synoptic Codes*, *Rawinsonde and Pibal Observations*, *Weather Radar Observations*, *Meteorological Rocket Observations*, and *Doppler Radar Meteorological Observations*.

To date, revisions have been completed for the *Surface Weather Observations and Reports* (FMH-1), *Surface Synoptic Codes* (FMH-2), *Rawinsonde and Pibal Observations* (FMH-3), *Meteorological Rocket Observations* (FMH-10), and *Doppler Radar Meteorological Observations* (FMH-11) handbooks. In May 1997, the Ad Hoc Group for FMH-3 finalized and published the third edition of FMH-3. This edition is a compilation of standards and procedures for taking, processing, encoding, communicating, and archiving rawinsonde and pibal observations. Previously, this information was described in FMH's 3 through 6. Federal agencies are continuing to develop the *Manual on Codes--U.S. Supplement* (FMH-12). This new handbook will include, along with other codes to be

determined, the Pilot Report (PIREP) code form that had been included in earlier versions of FMH-1.

New versions of all handbooks are available to private-sector users through the Customer Services at the National Climatic Data Center, Asheville, North Carolina. Federal agencies may request copies from the OFCM.

Meteorological Publications of OFCM

The preparation of federal plans is a major responsibility of the Federal Coordinator and requires extensive planning and coordination. Generally, federal plans are prepared for each of the specialized meteorological services and for meteorological programs common to two or more agencies. The federal coordinating committees and working groups compile information from the involved agencies and propose a unified plan for consideration. Current publications of the Federal Coordinator for Meteorology are listed in Table 2.1. With the exception of FMH's, copies of OFCM publications are available upon request.

RELATED FEDERAL METEOROLOGICAL COORDINATION

The focus of OFCM and of this report is on federal operational meteorological programs and supporting research that directly supports the operational programs. Brief descriptions are given below of federal coordination activities that are not specifically a part of OFCM activities.

Surface Transportation - Road/Weather Information System

Throughout FY 1997, the OFCM participated in several meetings and workshops to assist the DOT's Federal Highway Administration (FHWA) with on-going activities related to the Intelligent Transportation System (ITS). OFCM provided technical assistance in meteorology and advice on meteorological codes related to the development of the National Transportation Communications for ITS Protocol (NTCIP). The primary objective of the NTCIP is to provide a communications standard that ensures the interoperability and interchangeability of traffic control and ITS devices (including meteorological sensors). In addition, staff members provided technical advice and shared information on similar remote sensing efforts

being conducted in other federal agencies.

OFCM staff and agency members participated in other meteorology-related, interagency programs which were not run by OFCM. These programs were under the auspices of the Committee for the Environment and National Resources and the Subcommittee for National Disaster Reduction. OFCM staff also participated in NOAA's North American Atmospheric Observing System (NAOS) activities. The goal of NAOS is to meet evolving NOAA requirements for North American atmospheric observations needed to support the assessment and prediction for weather and climate.

World Weather Program

Some federal agencies participate in international activities relating to meteorological services and data exchange. These activities are carried out under the World Weather Program of the World Meteorological Organization, which is a specialized agency of the United Nations. The World Weather Program is described in Appendix E.

Table 2.1 Current OFCM Publications

<u>Publication Title</u>	<u>Date</u>	<u>Number</u>
Federal Plan for Meteorological Services and Supporting Research, Fiscal Year 1997	June 1996	FCM-P1-1996
National Plan for Space Environment Services and Supporting Research: 1993-1997	August 1993	FCM-P10-1993
National Severe Local Storms Operations Plan	February 1997	FCM-P11-1997
National Hurricane Operations Plan	May 1997	FCM-P12-1997
National Winter Storms Operations Plan	September 1996	FCM-P13-1996
Federal Plan for Cooperative Support and Backup Among Operational Processing Centers	May 1996	FCM-P14-1996
National Plan for Stratospheric Monitoring, 1988-1997	July 1989	FCM-P17-1989
National Aircraft Icing Technology Plan	April 1986	FCM-P20-1986
National Plan to Improve Aircraft Icing Forecasts	July 1986	FCM-P21-1986
Federal Plan for the Coordination of Automated Weather Information System Programs	May 1988	FCM-P23-1988
Federal Plan for Meteorological Information Management	July 1991	FCM-P24-1991
National Plan for Tropical Cyclone Research and Reconnaissance (1997-2002)	January 1997	FCM-P25-1997
National Aviation Weather Program Plan	September 1992	FCM-P27-1992
Federal Plan for Marine Environmental Services and Supporting Research	June 1996	FCM-P29-1996
The National Space Weather Program: Strategic Plan	August 1995	FCM-P30-1995
The National Space Weather Program: Implementation Plan	January 1997	FCM-P31-1997
National Aviation Weather Strategic Plan	April 1997	FCM-P32-1997
Federal Meteorological Handbook No. 1 - Surface Weather Observations and Reports	December 1995	FCM-H1-1995
Federal Meteorological Handbook No. 2 - Surface Synoptic Codes Surface Synoptic Code Tables (Update)	December 1988 July 1990	FCM-H2-1988 FCM-T1-1990
Federal Meteorological Handbook No. 3 - Rawinsonde & Pibal Observations	May 1997	FCM-H3-1997
Federal Meteorological Handbook No. 10 - Rocketsonde Observations	December 1988	FCM-H10-1988
Federal Meteorological Handbook No. 11 - Doppler Radar Meteorological Observations		
Part A - System Concepts, Responsibilities and Procedures	June 1991	FCM-H11A-1991
Part B - Doppler Radar Theory and Meteorology	June 1990	FCM-H11B-1990
Part C - WSR-88D Products and Algorithms	February 1991	FCM-H11C-1991
Part D - WSR-88D Unit Description and Operational Analysis	April 1992	FCM-H11D-1992
Directory of Atmospheric Transport and Diffusion Models, Equipment, and Projects	April 1993	FCM-I3-1993
Federal Directory of Mobile Meteorological Equipment and Capabilities	December 1995	FCM-I5-1995
A Guide to WMO Code Form FM 94 BUFR	March 1995	FCM-I6-1995
Tropical Cyclone Studies	December 1988	FCM-R11-1988
Tropical Cyclone Studies Supplement	August 1989	FCM-R11-1988 S
Interdepartmental Meteorological Data Exchange System Report, IMDES (under revision)	July 1991	FCM-R12-1991
Federal Meteorological Requirements 2000	October 1990	FCM-R13-1990
Standard Formats for Weather Data Exchange Among Automated Weather Information Systems	November 1994	FCM-S2-1994
Standard Telecommunication Procedures for Weather Data Exchange (under revision)	October 1991	FCM-S3-1991
Federal Standard for Siting Meteorological Sensors at Airports	August 1994	FCM-S4-1994
51 st Interdepartmental Hurricane Conference (Minutes)	May 1997	None